3E1201

Roll No. _____ [Total No. of Pages : 4

3E1201

B.Tech. III-Sem. (Main & Back) Examination, January/February - 2024

Artifical Intelligence & Data Science

3AID2-01 Advanced Engineering Mathematics

AID, CAI, CS, IT, CCS, CDS, CIT, CSD, CSR

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part-A, Five questions out of seven questions from Part-B and Three questions out of Five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What is the difference between linear and non linear programming problem.
2. What is optimization Technique? Give example.
3. What is mean, variance and standard Deviation of Uniform Distribution and Exponential Distribution.
4. Fit a straight line of following set of observation

x	1	2	3	4	5
y	2	4	6	8	10

5. What is spearman rank correlation?
6. Write the dual of

$$\begin{aligned} Max \quad & z = x_1 + 3x_2 \\ St \quad & 3x_1 + 2x_2 \le 6 \\ & 3x_1 + x_2 = 4 \\ & x_1, x_2 \ge 0. \end{aligned}$$

7. Find the maxima and minima of $x_1^3 + x_2^3 + 9x_1^2 + 18x_2^2 + 144$

8. Find all the basic solution of the system.

$$2x + y - z = 2$$
$$3x + 2y + z = 3$$

9. What is difference between skewness and kurtosis.

10. Find the optimal assignment for the problem with minimum cost.

	I	II	III	IV
A	5	3	1	8
B	7	9	2	6
C	6	4	5	7
D	5	7	7	6

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4 =20)**

1. Define Poisson Distribution. Derive it a limiting case of Binomial distribution Find the mean and Variance also.

2. The joint probability mass function of (X, Y) is given by

$$P_{XY}(x_i, y_j) = \begin{cases} \lambda x_i^2 y_j & i = 1,2 \; ; j = 1,2,3 \\ 0 & otherwise \end{cases}$$

i) Find λ

ii) Find the marginal probability mass function of x and y.

3. Old hens can be bought at Rs 2.00 with young.Ones at Rs 5.00 each. An old hen lays 3 eggs a young one 5 eggs a week.Each egg is sold for 30P. if the expenses incurred on their feeding be Rs 1.00 per hen per week, find how many hens of each kind a person having Rs.80 for investment can purchase to earn maximum profit , if he has accomodation only for 20 hens in his house.

4. Optimize $Z = x^2+y^2+z^2$

Subject to $4x+y^2+2z=14$

5. Use simplex method to solve the LP problem

Maximize $Z = 4x_1+3x_2$

Subject to $2x_1+x_2 \leq 10$

$3x_1+2x_2 \leq 16$

$x_1x_2 \geq 0.$

6. Obtain the optimal transportation plan from the following table.

Market Plan	M_1	M_2	M_3	M_4	Supply
P_1	4	6	8	13	50
P_2	13	11	10	8	70
P_3	14	4	10	13	30
P_4	9	11	13	8	50
Demand	25	35	105	20	

7. Calculate the coefficient of correlation and obtain lines of regression for the following data.

x	1	2	3	4	5	6	7	8	9
y	9	8	10	12	11	13	14	16	15

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. If θ be the acute angle between the two line of regression of variables x and y, show that $\tan\theta = \frac{1-r^2}{r} \frac{\sigma x \sigma y}{\sigma x^2 + \sigma y^2}$ where $r, \sigma x, \sigma y$ have their usual meaning. Explain the significance where r = 0 and r = $\pm$ 1

2. A random variable x has the following probability distribution:

x	0	1	2	3	4	5	6	7
$P(x)$	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

i) Find K.

ii) Evaluate $P(x<6)$, $P(x \geq 6)$ *and* $P(0<x<5)$

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iii) Find distribution function of x.

iv) Find $P\left(\frac{1.5 < x < 4.5}{x > 2}\right)$

3. Solve the following problem.

Minimize $f(x) = x_1^2 + x_2^2 + x_3^2$

Subject to $g_1(x) = 2x_4 + x_2 - 5 \le 0$

$g_2(x) = x_2 + x_3 - 2 \le 0$

$g_3(x) = 1 - x_1 \le 0$

$g_4(x) = 2 - x_2 \le 0$

$g_5(x) = -x_3 \le 0$

4. What arc the engineering Application of optimization also give various classification of optimization problems.

5. Use Two phase simplex method to solve the following LPP

Max $z = 5x_1 + 8x_2$

S.t $3x_1 + 2x_2 \ge 3$

$x_1 + 4x_2 \ge 4$

$x_1 + x_2 \le 5$

$x_1, x_2 \ge 0$

3E1200

Roll No. _____ [Total No. of Pages : 4

3E1200

B.Tech. III-Sem. (Main & Back) Examination, January/February- 2024

Agricultural Engineering

3AG 1-03 Managerial Economics and Financial Accounting

All Branches

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory **(10×2=20)**

1. Explain Gross Domestic Product (GDP).
2. Draw circular flow of economic activities
3. Draw graph to show
   a) Perfectly Inelastic Demand
   b) Perfectly elastic demand **(1 + 1=2)**
4. What is Giffen Paradox?
5. Give mathematical form of Cobb - Douglas production function.
6. Define Explicit and implicit costs with example. **(1 +1= 2)**
7. Draw a chart to show different market structures.
8. List four important features of Monopoly market. **(0.5 × 4 = 2)**

9. What is golden rule of accounting for real accounts? (1 +1 =2)

10. Define payback period.

PART - B

(Analytical/Problems solving questions)

Attempt any Five questions (5×4 =20)

1. Define National Income. Explain steps involved in the estimation of national income by income method. (1+3=4)

2. Explain economies and diseconomies of scale with examples. (2+2=4)

3. How will you calculate cash flows from operating activities by direct and indirect method. Explain with example. (2+2=4)

4. a) Why is the demand curve of a firm under monopolistic competition more elastic than under monopoly? Explain.

   b) Explain 'freedom of entry and exit to firms in industry' feature of monopolistic competition. (2+2=4)

5. Explain following with help of suitable graph. (1×4=4)

   a) Zero income elasticity

   b) Negative Income elasticity

   c) Unit incom elasticity

   d) Income elasticity greater than unity

6. Give brief answer of following Questions on Balance Sheet: (1×4=4)

   a) On balance sheet, accruals, notes payable, and account payable are listed under which category?

   b) Inventories, cash and equivalents, and accounts receivables are listed as?

   c) A firm buys products but does not pay to suppliers instantly. This is recorded as?

   d) In a balance sheet, the total of common stock and retained earnings are denoted as?

7. Explain following ratios: (Formula is must) (2+2=4)

   a) Liquidity Ratio

   b) Solvency Ratio

PART - C

(Descriptive/Analytical/Problems Solving/Design question)

Attempt any Three questions **(3×10=30)**

1 a) Complete the following table: (0.25×30 =7.5)

QTY (UNITS)	TFC (Rs.)	TVC (Rs.)	TC (Rs.)	AVC (Rs.)	ATC (Rs.)	MC (Rs.)
0	60	.....	.....	.....	.....	.....
1	.....	30	.....	.....	.....	.....
2	.....	.....	100	.....	.....	.....
3	.....	.....	.....	.....	.....	5
4	.....	.....	.....	.....	28.75	.....
5	.....	.....	.....	15	.....	.....

b) Draw graph/graphs showing relationship between any five Costs with Quantity (Units).

You can show them in single graph or in separate five graphs. **(0.5×5=2.5)**

2. Calculate and also comment on degree of elasticity: **(4×2.5=10)**

a) The price of tea per cup is decreased from Rs. 4 to Rs.3 and the demand of coffee is increased from 2 cups per day to 4 cups per day. Calculate Cross Elasticity of Demand.

b) Mr. Gupta's income is raised from Rs. 10,000 to Rs. 15,000 and the demand for good A is raised from 500 to 800 units. Calculate Income Elasticity of Demand.

c) The demand of commodity X is raised from 200 to 250 units when price decreased from Rs. 8 to Rs. 6. Calculate Price Elasticity of Demand.

d) If the price rises of good A rises from Rs. 20 to Rs. 30. Its supply increases from 200 to 800 units. Calculate Elasticity of Supply.

3. "Economics is an art." Elaborate this statement by explaining meaning, nature and scope of Economics. **(2+4+4=10)**

4. "A competitive firm is not a price maker, but adjustor." Explain this statement with reference to price determination in long and short term under perfect competition.

(4+6=10)

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5. From the following balance sheet of Brown and co. Ltd. as on 31st Dec. 2020 and 31stDec.2021:

Liabilities	2020 (Rs.)	2021 (Rs)	Asset	2020 (Rs.)	2021 (Rs.)
Share capital	5,00,000	7,00,000	Land & Building	80,000	1,20,000
Profit & loss a/c	1,00,000	1,60,000	Plant & Machinery	5,00,000	8,00,000
General Reserve	50,000	70,000	Stock	1,00,000	75,000
Sundry creditors	1,53,000	1,90,000	Sundry Debtors	1,50,000	1,60,000
Bills payable	40,000	50,000	Cash at Bank	20,000	20,000
Expenses O/S	7,000	5,000			
TOTAL	**8,50,000**	**11,75,000**	**TOTAL**	**8,50,000**	**11,75,000**

Additional Information:

a) Rs. 50,000 depreciation has been charged on Plant and Machinery during 2021.

b) A piece of Machinery was sold for Rs. 8,000 during the year 2021. It had cost Rs. 12,000; depreciation of Rs. 7,000 had been provided on it.

Prepare a Schedule of changes in Working Capital and a Statement showing the Sources and Application of Funds for 2021. **(3+3+2+2=10)**

(Show Adjusted Profit & Loss Account and Plant & Machinery Account in working notes.)

3E1250

Roll No. _____ [Total No. of Pages : 2

3E1250

B.Tech. III-Sem. (Main & Back) Examination, January/February - 2024

Agricultural Engineering

3AG1-02/Technical Communication

All Branches

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

*Attempt all **Ten** questions from Part A, **Five** questions out of **Seven** questions from Part B and **Three** questions out of **Five** questions from Part C.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly.

*Use of following supporting material is permitted during examination. (Mentioned in form **No. 205**)*

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What are various aspects of technical communication?
2. Write two importance of technical communication.
3. Define style in technical communication.
4. What are various steps to read a technical text?
5. List the benefits of note - making.
6. Name different technical texts.
7. Correct the following sentences.
   i) Both the sister were seen at the party.
   ii) She is one of the best student in our class.
8. Form two words by using the each prefix - in and - un.

9. Underline and rewrite the noun phrase in the following sentences.

   i) The cat with the stripes tried to trip me.

   ii) My green gym socks are in the hamper.

10. Write a short note on Linguistic Ability.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Explain ERRQ and SQ3R Reading Technique.
2. Reading makes a man complete francis Bacon. How can you develop effective reading skills'?
3. What is the process of reading a technical manual?
4. Elaborate various ways to collect information.
5. Enlist various factors which affect designing of a document.
6. What are various types of technical articles? Explain.
7. Enumerate the different characteristics of technical project proposal.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Explain various types of note-making.
2. Describe various features of style in technical communication.
3. Assume yourself as the cultural secretary, you are organizing an instrument playing programme in your Institute/College/ University. Draft an e-mail informing all the teachers, students and staff members of your College about the event and invite them to attend the event. Invent the necessary details.
4. Assuming yourself a hostler, write minutes of the meeting, which you have attended with the hostel wardern and chief warden to improve the quality of food served in the hostel mess.
5. Prepare a report on the Campus placement Drive organized in your College on 12th Jan. 2023.

3E1102

Total No. of Questions: **Total No.of Pages:**

Roll No. _____

B.Tech. III-Sem (Back) Exam 2024
HSMCAeronautical Engineering
3AN1-02Technical Communication
3E1102
All branches

Time: 2 Hours **Maximum Marks: 80**
Min. Passing Marks: 28

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1_____ 2. _____

Part A(Answer should be given up to 25 words only)
All questions are compulsory

Q. 1 what is the meaning of Technical communication?

Q.2Write Down the Various Communication Skills?

Q.3What is the importance of Conference?

Q.4why do we take notes from a long passage? What is its utility?

Q.5Rewrite the name of the following book as you would put it in a bibliographical reference: 1979. 3rd edition. Macmillian. The Elements of Style written by W. Strunk and E. B. White.

5 x 2 = 10

Part BAnalytical/Problem solving questions
Attempt any four questions

Q.1Write an oral presentation for a debate on "Modern Technology is doing more harm than good to man". You are to speak for one minute in favour of the topic.

Q.2How is technical paper written?

Q.3What do you understand by the term technical communication? How is it different from general purpose communication?

Q.4.What is group discussion? Discuss the importance of group discussion and how it is helpful in interviews?

Q.5should email replace the communication forms such as memos and letters? Explain your answer?

Q.6What is Report? Discuss various sections of a formal report in detail.

4 x 10 =40

Part C(Descriptive/Analytical/Problem Solving/Design Question)
Attempt any two questions

Q. 1As the purchase officer of a company, write a complaint letter to comfort Home Appliances, New Delhi, pointing out the damage which was discovered after checking the consignment containing Refrigerators sent to you by supplier

Q.2Write the difference between the following terms with suitable examples:-

(a) Memos and reports.
(b) Press release and newsletters
(c) Dissertation and thesis
(d) References and bibliography

Q.3Write an essay on one of the following:-

a) India in 20-20
b) Role of youth society.

2 x 15 =30

3E1103

Total No. of Questions: Total No.of Pages:

Roll No. _____

B.Tech.III Sem (Back) Exam 2024
HSMCAeronautical Engineering
3AN1-03Managerial Economics & Financial Accounting
3E1103
All branches

Time: 2 Hours **Maximum Marks: 80**
Min. Passing Marks: 28

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No.205)

1._____ 2. _____

Part A(Answer should be given up to 25 words only)
All questions are compulsory

Q. 1 Define Managerial Economics?

Q.2 What is Normative Theory of Economics?

Q.3What are the features of Oligopoly?

Q.4 Define Time Value of Money?

Q.5 Mention the concept of Demand?

5 x 2 = 10

Part BAnalytical/Problem solving questions
Attempt any four questions

Q.1Describe fully the concept of price elasticity of demand?

Q.2State the relationship of managerial economics with Other Subjects?

Q.3 What is Perfect Competition State its features?

Q.4.Explain the Different Features of Business Cycle?

Q.5 Explain Capital Budgeting?

Q.6Calculate the BEP in units and rupees using the following details: • Selling price per unit Rs. 100 • Variable costperunitRs.60•FixedcostsRs.20,000•ActualsalesRs.2,00,000

4 x 10 =40

Part C(Descriptive/Analytical/Problem Solving/Design Question)
Attempt any two questions

Q. 1 Explain the concept of Managerial Economics? List out the applications and importance of Managerial Economics?

Q.2How is price and output determination under monopoly different from that under perfect competition?

Q.3. A Company prepares a budget to produce 3, 00,000 Units, with fixed costs as Rs. 15, 00,000 and average variable cost of Rs.10 per unit. The selling price is to Yield 20%profit on Cost. You are required to calculate
(a) BEP in Rupees
(b) P/V Ratio
(c) Margin of Safety

2 x 15 =30

3E1203

Roll No. _____ [Total No. of Pages : 3

3E1203

B.Tech. III-Sem. (Main/Back) Examination, January/February - 2024

Artificial Intelligence and Data Science

3AID3-04 Digital Electronics

AID, CAI, CS,IT,CCS, CDS,CIT,CSD,CSR

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

*Attempt all **Ten** questions from Part A, **Five** questions out of **Seven** questions from Part B and **Three** questions out of **Five** questions from Part C.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly.

*Use of following supporting material is permitted during examination. (Mentioned in form **No.205**)*

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. List the different types of flip flops. (2)
2. Define reflective codes. (2)
3. State De Morgan's theorem. (2)
4. Convert $(10101101)_B \rightarrow (\ )_G$ (2)
5. Explain race around condition in JK flip flop. (2)
6. Illustrate Excitation table of SR flip flop. (2)
7. Explain don't care condition. (2)
8. Show the classification of digital logic families. (2)
9. Solve (0100 1000. 01111001)xS-3 = $(\ )_{10}$ (2)
10. Calculate the value of x. $(23)_x+(12)_x = (101)_x$. (2)

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. What is multiplexer? Design 4:1 MUX using 2:1 MUX. (4)
2. Interpret the function f = A+BC in canonical POS form (Product of Sum form). (4)
3. Design full adder circuit using half adders. (4)
4. Construct CMOS NAND and CMOS NOR gate for two inputs. (4)
5. Show that
   i) AB + A'C + BC = AB + A'C (2)
   ii) AB+A'C = (A+C) (A'+B) (2)
6. Consider two binary numbers X = 1010100 and Y = 1000011, perform the subtraction using 2's S complement.
   i) X-Y (2)
   ii) Y-X (2)
7. What are decoders? Implement the following boolean function using 3 to 8 decoder $f(A,B,C) = \Sigma_m (2,4,5,7)$ (4)

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. Simplify the following boolean function using quine McCluskey method and verify the result using k-map also. $F(A,B,C,D) = \Sigma_m (1,2,3,7,8,9,10,11,14,15)$ **(10)**
2. Design a 3-bit synchronous counter using JK flip flops. **(10)**

3. Explain the following terms:

   i) Naise Margin **(2)**

   ii) Propagation Delay **(2)**

   iii) Fan - In **(2)**

   iv) Fan-out **(2)**

   v) Power Dissipiation **(2)**

4. Design a 4-bit binary to gray code converter and realize it using logic gates. **(10)**

5. Explain the working of 4-bit serial in parallel -out shift register along with the waveform. **(10)**

3E1202

Roll No. _____ [Total No. of Pages : 3

3E1202

B.Tech. III Sem. (Main&Back) Examination, January/February - 2024

Artificial Intelligence & Data Science

3AID4-05 Data Structures and Algorithms

AID, CAI, CS,IT,CCS, CDS,CIT,CSD, CSR

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

ALL questions are Compulsory. **(10×2=20)**

1. What is Data structure?
2. Explain Asymptotic Notations?
3. What are linear and non-linear data structural .
4. What is linked list? What are its types?
5. Write applications of stacks.
6. Define complete Binary Tree?
7. Differentiate between static and Dynamic memory allocation.
8. What is the concept of minimum spanning Tree?
9. What is meant by abstract data type?
10. Compare tree and graph.

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions. **(5×4=20)**

1. Explain tower of Hanoi problem in detail and write algorithm for that.
2. Calculate the address of the element A[15,25] using row major order and column major order for an array A[-15.....10, 15.....40] of elements. It is stored at location 100 and the size of each element is 4 bytes.
3. Write an algorithm to insert a node at specific location in circular linked list.
4. The in-order and pre-order traversal sequence of modes in a binary tree are given below:

   In-order: Q, B, K, C, F, A, G, P, E, D, H, R

   Pre-order: G, B, Q, A, C, K, F, P, D, E, R, H

   Draw the binary tree.
5. What is Priority Queue? How can it be implemented ? Write an applications of priority Queue.
6. Convert the following expression in its equivalent postfix expression.

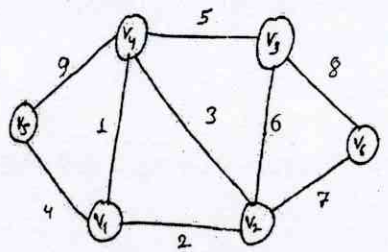
   A+(B×C - (D/E ^ F) ×G) ×H
7. Differentiate single linked list and circular linked list. Also write the advantage and disadvantages of circular linked list.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any THREE questions. **(3×10=30)**

1. Define the spanning tree. Write the Kruskal's algorithm to find the minimum cost spanning tree of the following.



2. What is an AVL Tree? Explain the concept of Balancing factor. Create an AVL tree using following sequence. 21,26,30,9,4,14,28,18,15,10,2,3,7

3. What is hashing and collision ? Discuss the advantages and disadvantages of hashing over other searching techniques.

4. Write an algorithm of Insertion sort. Sort the following elements using Insertion sort: 68,17,26,54,77,93,31,44,55,20

5. Write down the algorithm for following operations of doubly linked list :-

   a) Insertion of a node in the middle location.

   b) Delete a node from last location.

3E1204

Roll No. _____ [Total No. of Pages : 2]

3E1204

B.Tech. III - Sem. (Main & Back) Examination, January/February - 2024

Artificial Intelligence & Data Science

3AID4-06 Object Oriented Programming

AID, CAI, CS, IT, CCS, CDS, CIT, CSD, CSR

Time : 3 Hours Maximum Marks : 70

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

ALL questions are compulsory. **(10×2=20)**

1. Why do we need the pre-processor directive # include < iostream >?
2. What are the applications of **void** data type in C++?
3. What are objects ? How are they created?
4. What is parameterized constructor?
5. Describe the syntax of Operator function.
6. What is a virtual base class?
7. What are the application of **this** pointer?
8. What role does the **iomanip** file play?
9. What are input and output stream?
10. What is generic programming?

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions. **(5×4=20)**

1. How does a constant defined by **const** differ from the constant defined by the pre-processor directive statement **#define**?
2. What is a **friend** function? What are the merits and demerits of using friend function?
3. What do you mean by Dynamic initialization of ob objects?
4. A friend function cannot be used to overload the assignment operator =. Explain why?
5. Class D is derived from Class B. The class D does not contain any data members of its own? Does the class D require constructors? If yes, why?
6. When do we make a virtual function "pure"? What are the implications of making a function a pure virtual function?
7. A template can be considered as a kind of MACRO. Then, what is the difference between them?

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any THREE questions. **(3×10 =30)**

1 Write a class template to represent generic vector. Include member functions to perform the following tasks:

   a) To create the vector
   b) To modify the value of a given element
   c) To multiply by a scalar value
   d) To display the vector in the form (10, 20, 30.....)

2. Write a main program that calls a deeply nested function containing an exception incorporate necessary exception handling mechanism?
3. Write a program to print a table of values of the function $y = e^{-x}$.
4. Create a class **MAT** of size m*n. Define all possible matrix operations for **MAT** type objects?
5. Write a program that reads the Name "Rajasthan Technical University" from the keyboard in to three separate string objects and then concatenate them into a new **string** object using + operator?

3E1205

Roll No. _____ [Total No. of Pages : 3

3E1205

B.Tech. III-Sem. (Main & Back) Examination, January/February - 2024

Artificial Intelligence & Data Science

3AID4-07 Software Engineering

AID, CAI, CS,IT,CCS, CDS,CIT,CSD, CSR

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory **(10×2=20)**

1. Define software. Enlist the characteristics of good software.
2. Give the difference b/w FP and LOC.
3. What is SRS?
4. Explain FSM model.
5. Why accuracy is important attribute for a data dictionaries.
6. What is software Design. Write any Four Design principles.
7. What is Input /Process/Output (IPO) approach in S/W Design.
8. What do you mean by OO concept. Write 3 OO principles.
9. Explain the term Risk Analysis. Enlist Four major categories of Risk analysis.
10. Differentiate b/w object oriented analysis (OOA) and Object Oriented Design (OOD).

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. What are the difference b/w verification and validation. Explain it with proper diagram and Example.
2. Write a short note on Object Oriented Design concepts.
3. Give the difference b/w DFD and CFD with proper example and diagram.
4. What is a good Software Design? Explain the Design Documentation with example.
5. Explain Software Development life cycle model with appropriate diagram.
6. What is prototyping? Give the sequence of events needed in prototyping.
7. Suppose that a project was estimated to be 400 KLOC. Calculate effort and time for each of three modes of development.

Table given as:

Mode	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi Detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions **(3×10=30)**

1. Explain spiral model of s/w Development with a labelled diagram, state advantages and disadvantages of spiral model.
2. What do you mean by DFD. Explain its type with proper diagram. Draw 0'level and 1-level DFD for college Registration system.
3. Explain Effective modular design in terms of cohesion and coupling with all its types and diagram.
4. Define the term UML. How it is useful in object oriented modeling. Explain the following in context of UML.
   i) Use case diagram
   ii) State chart diagram.

5. Compute the function point productivity, documentation, cost per function for the following data:

Measurement Parameter	Count	Weighing Factor
i) No. of External Input (EI)	24	4
ii) No. of External output(EO)	46	4
iii) No. of External Inquiries (EQ)	8	6
iv) No. of Internal files (ILF)	4	10
v) No. of External interfaces (EIF)	2	5

vi) Effort -36.9 PM

vii) Technical documents -265 pages

viii) User documents - 122 pages

ix) Cost = $ 7744/month

Various processing factors are: 4, 1, 0. 3, 3, 5, 4, 4, 3, 3, 2, 2, 4, 5.